



Division of Community and Public Health

Section: 4.0 Diseases or Conditions


Updated 11/2015

Subsection: Hemorrhagic Fevers (Viral)

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## Hemorrhagic Fevers (Viral)

### **Overview** <sup>(1,2)</sup>

Viral hemorrhagic fever (VHF) is a general term for illness caused by members of several different viral families. Most of the viruses causing this illness are restricted in their geographic range by the limitations of their natural host species, which are usually rodents, insects, or perhaps bats and other mammals. It is essential for rapid diagnosis and case management that a travel history is obtained from the patient.

This section will focus on those viruses that initially present with similar symptoms and may progress to more severe forms of illness, including Ebola, Marburg, New World Arenaviruses (Guanarito, Junin, Machupo, Sabia), Old World Arenaviruses (Lassa, Lujo), and Crimean-Congo hemorrhagic fever (CCHF). Viral candidates for illnesses similar to VHF (dengue, hantavirus, and yellow fever) are discussed in separate sections of this manual.

For a complete description of VHFs, refer to the following texts:

- *Control of Communicable Diseases Manual (CCDM)*, American Public Health Association, 19th ed. 2008.
- *American Academy of Pediatrics. Red Book: 2012 Report of the Committee on Infectious Diseases.* 29th ed. 2012.

### **2011 Case Definition (11/15), VHFs – Ebola, Marburg, New World Arenaviruses, Old World Arenaviruses, and CCHF** <sup>3</sup>

#### Clinical Criteria:

An illness with acute onset with ALL of the following clinical findings:

- A fever >40°C (104°F)
- One or more of the following clinical findings:
  - Severe headache
  - Muscle pain
  - Erythematous maculopapular rash on the trunk with fine desquamation 3–4 days after rash onset
  - Vomiting
  - Diarrhea
  - Pharyngitis (arenavirus only)
  - Abdominal pain
  - Bleeding not related to injury
  - Retrosternal chest pain (arenavirus only)
  - Proteinuria (arenavirus only)
  - Thrombocytopenia



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Laboratory Criteria for Diagnosis:

One or more of the following laboratory findings:

- Detection of VHF viral antigens in blood by enzyme-linked immunosorbent assay (ELISA) antigen detection.
- VHF viral isolation in cell culture for blood or tissues.
- Detection of VHF-specific genetic sequence by reverse transcription-polymerase chain reaction (RT-PCR) from blood or tissues.
- Detection of VHF viral antigens in tissues by immunohistochemistry.

Epidemiologic Linkage:

One or more of the following exposures within three weeks before onset of symptoms:

- Contact with blood or other body fluids of a patient with VHF.
- Residence in, or travel to, a VHF-endemic area.
- Work in a laboratory that handles VHF specimens.
- Work in a laboratory that handles bats, rodents, or primates from endemic areas.
- Exposure to semen from a confirmed acute or convalescent case of VHF within the 10 weeks of that person's onset of symptoms.

Case Classification:

- Suspected: Case meets the clinical and epidemiologic linkage criteria.
- Probable: There is no CSTE/CDC classification category for this.
- Confirmed: Case meets the clinical and laboratory criteria.


**Information Needed for Investigation**

**Verify the diagnosis:** Does the laboratory test result provide evidence of a recent VHF infection? Perform a standard case investigation to obtain or confirm clinical and epidemiologic data by obtaining the pertinent symptoms and outcome from the patient's health care provider, the facility infection preventionist, or other affiliated health care professional:

- Demographics (age, sex, race/ethnicity, place of residence).
- Clinical symptoms and syndrome.
- Date of illness onset.
- Hospitalization and outcome.

**Establish the scope of the investigation:** Look back 21 days prior to illness onset:

- Travel history in the 21 days prior to illness onset (from the patient or the patient's family, neighbors, co-workers, social worker, or health care provider)
  - Recent travel: Determine the specific dates and location of travel in the 21 days prior to illness onset.
  - No recent travel: Determine if the local health department or healthcare provider is aware of other similar cases in the area or among contacts of the patient.

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- Works in laboratory or clinical setting?
- Pregnant or breast feeding?
- Contacts with similar illness?
- If the patient is a recent organ, tissue (e.g., corneas, skin), or blood donor or recipient:
  - Notify blood or tissue banks.
  - Quarantine remaining co-component blood or tissues.
  - Identify other possibly exposed patients.
  - Notify BCDCCP.


NOTE: Some VHF (filoviruses [e.g., Ebola, Marburg] and arenaviruses [e.g., Lassa, Machupo]) are potential Category A Bioterrorism agents. **If the case has no remarkable travel history, a bioterrorism event should be considered.**

*If VHF is suspected to be the result of a terrorist act or the intentional or deliberate release thereof; the LPHA should:*

1. **Notify local law enforcement** and the [Senior Epidemiology Specialist](#) for the District, or the Missouri Department of Health and Senior Service’s Emergency Response Center (ERC) at (800) 392-0272 (24/7) immediately.
2. Work with law enforcement and implement “Chain of Custody” procedures for all laboratory samples, as they will be considered evidence in a criminal investigation.
3. Work to define the population at risk which is essential to guide response activities. Public health authorities will play the lead role in this effort, but must consult with law enforcement, emergency response and other professionals in the process.
4. Once the mechanism and scope of delivery have been defined, identify symptomatic and asymptomatic individuals among the exposed and recommend treatment and/or chemoprophylaxis.
5. Establish and maintain a detailed line listing of all cases and contacts with accurate identifying and locating information.

### **Notification**

- Contact the [District Communicable Disease Coordinator](#), the [Senior Epidemiology Specialist](#) for the District, or MDHSS/Office of Veterinary Public Health (OVPH), phone (573) 526-4780, Fax (573) 751-6185; after hours and weekends call (800) 392-0272 immediately if a VHF is suspected.
- If a case(s) is associated with a childcare center, BCDCCP or the local public health agency (LPHA) will contact the Bureau of Environmental Health Services (BEHS), phone (573) 751-6095, Fax (573) 526-7377 and the Section for Child Care Regulation, phone (573) 751-2450, Fax (573) 526-5345.
- If a case(s) is associated with a long-term care facility, BCDCCP or the LPHA will contact the Section for Long Term Care Regulation, phone (573) 526-8524, Fax (573) 751-8493.

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- If a case is associated with a hospital, hospital-based long-term care facility, or ambulatory surgical center, BCDCP or the LPHA will contact the Bureau of Health Services Regulation phone (573) 751-6303, Fax (573) 526-3621.

### **Control Measures**

See the Control of Communicable Diseases Manual, viral hemorrhagic fever sections, “Methods of control.”

See the Red Book, viral hemorrhagic fever sections, “Control Measures.”

See the disease specific websites provided in the Website section of this document.

### **Laboratory Procedures**

#### Specimens:


The State Public Health Laboratory (SPHL) does not perform VHF testing. All requests from medical providers regarding testing for these agents by CDC must be coordinated through the SPHL. Requests from **medical professionals** for laboratory testing of possible Ebola or other VHF specimens **must be coordinated through MDHSS** by calling BCDCP, Monday through Friday, 8:00 AM to 5:00 PM, (573) 751-6113; after hours and weekends, call (800) 392-0272.

Many of the VHF agents are biosafety level (BSL)-4 agents and should only be examined in a BSL-4 laboratory. Only specimens essential for diagnosis or monitoring should be collected and strict universal precautions must be used during collection. In addition, special precautions must be taken when transporting these specimens. Specific instructions regarding type of specimen(s), handling/shipping procedures, and personal protective measures will be provided when contact is made with MDHSS by the person requesting specimen analysis.

### **Reporting Requirements**

VHFs are Category 1(A) State Reportable Diseases and shall be reported to the [local health authority](#) or to MDHSS **immediately** upon first knowledge or suspicion by telephone, facsimile or other rapid communication. MDHSS may be contacted Monday through Friday, 8:00 AM to 5:00 PM, telephone (573) 751-6113 or fax (573) 526-0235; after hours and weekends telephone (800) 392-0272.

As Nationally Notifiable Conditions, **confirmed and suspected** VHF cases, where **intentional release is suspected**, are an **IMMEDIATE, EXTREMELY URGENT** report to the Centers for Disease Control and Prevention (CDC). **IMMEDIATE, EXTREMELY URGENT** reporting requires MDHSS to call the CDC EOC at 770-488-7100 within 4 hours of a case meeting the notification criteria; followed by submission of an electronic case notification via WebSurv in the next regularly scheduled electronic transmission.

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As Nationally Notifiable Conditions, **confirmed and suspected** VHF cases, where **suspected intentional release is not suspected**, are an **IMMEDIATE, URGENT** report to the Centers for Disease Control and Prevention (CDC). **IMMEDIATE, URGENT** reporting requires MDHSS to call the CDC EOC at 770-488-7100 within 24 hours of a case meeting the notification criteria; followed by submission of an electronic case notification via WebSurv in the next regularly scheduled electronic transmission.

1. Health care providers should **immediately** report any suspected and confirmed VHF cases to the [local health agency](#) of the patient’s residence or MDHSS.
2. For confirmed cases complete a [“Disease Case Report”](#) (CD-1) and send the completed form to the [MDHSS District Health Office](#).
3. Entry of the completed CD-1 into the WebSurv database negates the need for the paper CD-1 to be forwarded to the District Health Office.
4. MDHSS will report to CDC following the above reporting criteria (see box).
5. All outbreaks or “suspected” outbreaks must be reported as soon as possible (by phone, fax, or e-mail) to the [District Communicable Disease Coordinator](#). This can be accomplished by completing the [Missouri Outbreak Surveillance Report](#) (CD-51).
6. Within 90 days of the conclusion of an outbreak, submit the final outbreak report to the District Communicable Disease Coordinator.


## **References**

1. Control of Communicable Diseases Manual. “Arenaviral Hemorrhagic Fevers in the Western Hemisphere”, “Crimean-Congo Hemorrhagic Fever”, “Ebola-Marburg Viral Diseases,” and “Lassa Fever.” Heymann, David L. ed. 19<sup>th</sup> ed. Washington, DC: American Public Health Association, 2008: 31-34, 59-61, 204-207, and 334-337.
2. American Academy of Pediatrics. “Ebola-Marburg Virus Infections in Biological Terrorism,” “Hemorrhagic Fevers from Arenaviruses”, “Hemorrhagic Fevers and Related Syndromes Caused by Viruses of the Family Bunyaviridae (CCHF).” In: Pickering, LK, ed. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29<sup>th</sup> ed. Elk Grove Village, IL: American Academy of Pediatrics; 2012: 111, 356-358, 358-360.
3. CDC’s National Notifiable Diseases Surveillance System (NNDSS) and Case Definitions. <http://www.cdc.gov/nndss/>. (8/14)

## **Websites**

1. “Ebola Hemorrhagic Fever,” CDC. <http://www.cdc.gov/vhf/ebola/> (8/14)
2. “Ebola Hemorrhagic Fever, Information for Health Care Workers,” CDC. <http://www.cdc.gov/vhf/ebola/hcp/index.html> (8/14)
3. “Marburg Hemorrhagic Fever,” CDC. <http://www.cdc.gov/vhf/marburg/> (8/14)
4. “Viral Hemorrhagic Fevers: Arena Viruses,” CDC. <http://www.cdc.gov/vhf/virus-families/arenaviridae.html> (8/14)



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5. “Crimean-Congo Hemorrhagic Fever,” CDC. <http://www.cdc.gov/vhf/crimean-congo/> (8/14)
6. “*CDC Health Information for International Travelers 2014—Yellow Book*, “Viral Hemorrhagic Fevers.” <http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/viral-hemorrhagic-fevers> (8/14)
7. “Ebola Virus Disease,” World Health Organization (WHO). <http://www.who.int/csr/disease/ebola/en/> (8/14)
8. World Animal Health Information Database (WAHID) – Version 1, World Organization for Animal Health (OIE); search by country/territory, disease, or control measures. [http://www.oie.int/wahis\\_2/public/wahid.php/Wahidhome/Home](http://www.oie.int/wahis_2/public/wahid.php/Wahidhome/Home) (8/14)
9. Viral Hemorrhagic Fevers – Bioterrorism Issues (MDHSS). <http://health.mo.gov/emergencies/ert/med/hemorrhagic.php> (8/14)

### **Public Education and Outreach**

Despite fear and anxiety that the word “Ebola” evokes in many people and the human tragedy of the Ebola outbreak in West Africa in 2014, CDC has stated that the normal barrier infection control precautions that are in place in medical facilities in the U.S. would prevent the spread of this virus, even if a person arrived in this country and was found to be ill from Ebola infection. Specifically, CDC states that Ebola is transmitted through direct contact with the blood or bodily fluids of an infected symptomatic person or through exposure to objects (such as needles) that have been contaminated with infected secretions. It is not a respiratory disease like the flu, so it is not transmitted through the air. Patients with Ebola are contagious only when they show symptoms and U.S. hospitals are well equipped to isolate cases and control spread of the virus. A widespread Ebola outbreak in the U.S. is extremely unlikely. The general public can be provided information on Ebola and other VHF viruses contained in the fact sheets shown in the table of contents of this section, and the public can also be provided with website links listed above. Information of this type will help alleviate undue fear and concern regarding illnesses falling within the category of VHFs.

### **Other Sources of Information**

1. Mandell, Douglas and Bennett’s *Principles and Practice of Infectious Diseases*. “Viral Hemorrhagic Fevers as Agents of Bioterrorism.” G. Mandell, J. Bennett, R. Dolin, eds. 7th ed. Vol. 2, 2010:3995-3998.
2. *Zoonoses and Communicable Diseases Common to Man and Animals: Chlamydioses, Rickettsioses, and Viroses*. Acha, PN and Szyfres B, 3rd ed. Vol. II, 2003. Scientific and Technical Publication No. 580. Pan American Health Organization, Washington DC.